§ 185. **Cleistogene—Flowers**—*The cleistogene flowers* of Viola cucullata are greatly deformed and yet very efficient. Their every ovule is impregnated, and their capsule full of seeds. The flower is closely inflected on its stalk, conical in shape, having only its pale green calyx to cover it, which it does closely, never opening until forced open by the growth of its ovary. The anthers are in close contact with the stigma and open towards it, discharging on it *all* their pollen : at least, while the pollen is plainly seen under the stigma suspended by its tubes, I could find none in the anther cells.

The average number of seeds in these capsules is 60, and the grains of pollen in each anther are certainly few, if any, more than 12. Here then is the economy of cleistogene flowers. They dispense with nectar, with superfluous pollen, and with the flaunting corolla, and yet, by husbanding all their pollen, secure a better crop even than the open vernal flowers.

Are the flowers of *Gentiana Andrewsii* properly cleistogene? They afford now an interesting study in connection with the question of insect agencies in fertilization. On the 19th of September I examined numerous specimens in all stages of advancement. In every flower *save one* the corolla was completely and *doubly* closed, as usual, by the interpetalary appendages in contorted folds, which are again covered by the true petals. The appendages are 2-lobed and in our specimens not at all fringed, as sometimes described. The 5 anthers, slightly cohering, closely encircle the short style just beneath and in actual contact with the 2 recoiled stigmas. After impregnation, the stigmas, by the growing ovary, are carried far above the anthers.

In every flower whose anthers were open pollen was found on the stigmas, but not scattered on other parts ; all that was not on the stigmas apparently remained yet in the anthers. This was the case even with that flower whose corolla was open by a small round aperture.

The grains are very small—four times smaller than those of the Morning-Glory. I estimated their number to be about 400 in each anther—2,000 in the 5 anthers. I also estimated the number of ovules in the ovary and seeds in the capsule, and found them to be 1000 (in some a little more, in others a little less.)

Nectar abounds in this as in other flowers, secreted in the depths of the corolla tube.

From these observations I infer that the flowers of the closed Gentian are properly *cleistogene ;* that insects have little or nothing to do in their fertilization. Of the 50 flowers examined both at night and morning, only one was opened (as if by an accident). None showed signs of disturbance of pollen previous to impregnation. In some of the half-grown capsules worms were found, having eaten their way in. The plant is doubtless completely self-fertilized. The nectar goes untasted, serving some other purpose than a bait for bees. The pollen is not wasted, and there is none or little to spare, being only 2 grains to each ovule.

§ 186. **Cereus serpentinus,** Lag.—A few days ago I was much surprised to see one of my night-flowering Cerei, perfect its bloom in the early hours of the day, Sept. 3d, instead of late in the even-